The Colored, Eco-Genetic Relationship Map (CEGRM): A Conceptual Approach and Tool for Genetic Counseling Research

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The Colored Ecological and Genetic Relational Map (CEGRM) [pronounced seegram] is a conceptual approach and tool for presenting information about family and nonkin relationships and stories about inherited diseases in a simple, understandable form. It combines information that can be derived from pedigrees, genograms, ecomaps, and social network analysis in a single, or series of, pictorial maps based on colors and shapes. The CEGRM is based on a social systems perspective, particularly emphasizing social exchange and resource theories. The CEGRM should be particularly useful in genetic counseling research with members of suspected cancer-risk families or families with other late-onset inherited diseases. A genetic counseling client comes with a social history and context as well as a genetic one. Client decision-making in terms of reproductive plans, therapeutic intervention, lifestyle behavior and sharing or withholding of genetic information frequently becomes enmeshed with preexisting psycho-social relationships among biological kin, affinal kin (in-laws) and fictive kin (friends who act as family). The CEGRM makes it easier to compare different types of social interactions between the client and his/her significant others and among family members on the same dimensions.

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INTRODUCTION

Genetic counseling clients come to clinic with a unique social history and context, as well as a genetic one. Individuals seek genetic information for many reasons, but regardless of their underlying motivation, they interpret the information that they receive according to their own values, cultural background, and social situation. Thus, client decision-making in terms of reproductive plans, therapeutic intervention, lifestyle behavior and sharing or withholding of genetic information frequently becomes enmeshed with preexisting social relationships among biological kin, affinal kin (in-laws), and fictive kin (friends who act as family).

Members of western society, even as children, internalize lay concepts of inheritance (Richards, 2000). In addition, many clients are not interested in risk estimates per se, but only in learning whether or not they will get cancer or another inherited condition. These basic differences may help explain in part why genetic counseling clients have trouble understanding and processing the information they receive in genetic counseling (Hallowell and Richards 1997; Kessler and Levine, 1987; Lippman-Hand and Fraser, 1979; Parsons and Atkinson, 1992; Watson et al., 1998). These misunderstandings are, at least partially, because of a mismatch between the genetic counselors emphasizing a statistical, probabilistic definition of risk while clients have a more existential meaning of risk that is embedded in a familial cultural context (Shiloh, 1996).

Addressing these issues is even more important today as genetic counselors increasingly counsel for familial disorders that can vary in age of onset, degree of severity, or even whether an individual will develop the disorder at all. For example, in cancer genetics research, the psychological aspects of cancer genetics risk counseling are being investigated (Croyle and Lerman, 1993; Eeles, 1996; Lerman et al., 1996; Peters, 1994; Schneider and Marnane, 1997; Watson et al., 1998). Recently, more attention has been given to the use of cancer genetic services and inherited disorders from a family and/or social perspective (Bowen et al., 1999; Codori et al., 1999; Daly et al., 1999; Geller et al., 1999, 2000; Glanz et al., 1999; Hamann et al., 2000; Peters et al., 1999; Smith et al., 1999).

Just as individuals have different characteristics, so do groups. Social groups vary on a number of dimensions. For example families may vary in their relative solidarity, i.e., whether they contain internal factions and the extent of the conflict between these factions. Families as groups also vary in the extent that the family ties are local, i.e., having strong, redundant ties within the group or cosmopolitan, i.e., having ties with individuals who are widely distributed geographically and belonging to many different groups (Stark, 1997).

Families also have other varying systems characteristics (Eunpu, 1997, 1999; Green et al., 1997; Kenen et al., 2001; Rolland, 1994):

- family structure,
- life cycle and life events such as illnesses,

- values, attitudes, and beliefs which vary, e.g.,
  - belief in a technological imperative,
  - belief that knowledge is power,
  - extent of religiosity,
  - value of openness and sharing,
  - trust in the medical community, and
  - the role of luck in health.
- cohesiveness,
- adaptability,
- communication and relational patterns,
- competence and functionality,
- problem solving and coping ability,
- social support, social exchanges and other resources, and
- affective responsiveness and involvement.

Genetic counselors need to understand clients' close nonkinship relationships as well as family social networks particularly in families with inherited cancer or other genetic diseases. For example, interviews with women from familial breast/ovarian cancer families found that almost all of these women had close friends with whom they shared everything. Some said that they were more open with these friends than they were with family members (Kenen et al., 2001). Family stories, relationships, and the use of heuristics (inferential shortcuts people use to make sense out of important complicated information) compose the soil in which the genetic information presented by the counselor is planted. Investigating relationships with nonbiological and nonaffinal kin may also help clarify why clients view genetic information in a given way or make certain decisions. These relationship variables are thought to be important mediating variables in understanding the ways clients, who use genetic services, assign meaning to and act on the genetic information they receive. Thus, understanding the ways in which a genetic condition is viewed and discussed within a social network is important for the provision of good genetic counseling and for the clients to make optimal decisions for their social as well as physical well-being.

Diagrams can be useful in understanding complex family interrelationships and the role of the family as part of the genetic counseling process. The pedigree is the most familiar example (Resta, 1993), providing basic information regarding family structure and health concerns. Building on previous research on genetic pedigrees (Bennett et al., 1995), genograms (Daly, 1999; Eunpu, 1997, 1999; McGoldrick et al., 1999), eco-maps (Hartman, 1995) and social network analysis (Turner, 1998), we have devised the Colored Ecological and Genetic Relational Map (CEGRM)[4] [pronounced see-gram]. We are introducing this new tool

as a means of systematically collecting information about various aspects of non-genetic and genetic relationships. The CEGRM combines elements of the pedigree, genogram, and ecomap. Its purpose is to help both client and genetic counselor understand more fully the client's perception about how her family/nonfamily exchange system operates and what effect this might have on her decision-making regarding her genetic risk by presenting these resource exchanges in a pictorial map based on colors and shapes.

At this time the CEGRM has not yet been pilot-tested, validated, or standardized. We are developing a computerized version that can be used in conjunction with one of the currently used pedigree construction software programs. When this is developed, we hope to pilot the CEGRM in a clinical cancer genetics setting. At present, we consider the CEGRM as a starting point to be refined through use. At this early stage of development the CEGRM is intended

- primarily, as an investigative research tool;
- secondarily, as a possible clinical interview tool; and
- thirdly, as a convenient and accessible way of storing a combination of family relational data together with pedigree data.

The CEGRM

- provides a mechanism to elicit family information from the client while the counselor/client is constructing the CEGRM;
- allows the research genetic counselor to compare social network relationships and communication patterns among different family members; and
- enables the research genetic counselor to trace changes in the client's social network over time.

The CEGRM makes it easy to compare different types of resource exchanges, e.g., service, information, and emotions between the client and members of his/her social network. It should enable genetic counselors working with clients at risk for inherited-susceptibility disorders to understand family level variables in more depth and help clarify the effect of genetic risk information on family relationships.

ORIGIN OF THE CEGRM IN GENOGRAMS, ECOMAPS, AND SOCIAL NETWORK ANALYSIS

The fields of social work, marriage and family therapy, and sociology have developed several tools to aid in understanding interpersonal relationships. The main ones are the genogram, the ecomap, and network analysis. A brief description of some salient features of each approach is described below.

The Genogram

Constructing the genogram is similar to drawing a family pedigree in that the counselor records males and female relatives with circles and squares that are joined by relationship lines (Eunpu, 1997). Usually information about family members and their life events and relationships over at least three generations is elicited and recorded. The types of relationships are the key element. The relational quality of those relationships is noted with a series of various superimposed lines. The genogram is frequently used to direct the client and counselors attention to elements of family situations that may directly, or indirectly, contribute to psychological or behavioral disturbances in vulnerable family members (Beauchesne et al., 1997; Friedman, 1991; Kuehl, 1995; Sherman, 2000).

McGoldrick and Gerson (1985) standardized genogram construction by drawing different types of lines between family members. Different kinds of lines represent the kinds of relationship, e.g., very close or fused (triple parallel lines); fused and/or conflictual (continuous "w's" superimposed on the double parallel lines); estranged or cut off (a horizontal line intersected by two perpendicular lines). Lewis (1989) suggested that color-coding for attributes or roles could be added to the standard genogram.

Daly et al. (1999) and Eunpu (1997, 1999) suggested that genetic counselors incorporate genograms as an extension of the family pedigrees that they already construct. Eunpu has integrated psychotherapeutic techniques into genetic counseling and has used genograms to depict the history of family beliefs and attitudes. She perceives these genograms to be an aid in client decision-making and coping with regard to inherited diseases. The genogram is a very useful tool, but it has a few limitations. In a large kinship, with a wide variety of types of relationships, the genogram can become difficult to read and interpret. Also, the genogram emerged from the practice of family therapists dealing with families that were dysfunctional as the reason for referral, whereas, we believe, along with Rolland (1994) that family's experiences around illness should be considered in a more normative context.

The Ecomap

The ecomap is another means of recording social interactions among and within social groups. By blending features of the ecomap (Hartman, 1995) with the genogram, we can include clients' significant others, particularly fictive kin—those who are not connected by blood or marriage, but who act as kin surrogates (Stack, 1974). The larger extended family network often is very influential among American families from non-western backgrounds or in ethnic subcultures. Fictive kin also play a large social role for individuals and families who are geographically removed from their biological kin (Stark, 1997). Family members not only interact with the immediate members of their household and extended family but with close

friends, work colleagues, recreation partners, health care personnel, school, and neighborhood friends. These significant others, particularly close friends, play very significant emotional roles in people's lives as well as providing sources of information, and exchanging services (Foa *et al.*, 1993; Foa and Foa, 1974). Basic to the CEGRM is a premise derived from the social theory that it is the meaning attributed to the behavior, not the behavior itself that is important (Foa *et al.*, 1993).

Human environments include networks of human relationships forming a complex interactive ecological system. Crucial data about family communication patterns and family stories, which can be quite complex, need to be arranged in a single, meaningful schemata to be of maximum value to counselor and client. The ecomap does this by diagramming the relationship of individuals in their total social space. While Hartman uses a simpler form of line depiction than does the later McGoldrick–Gerson model, the ecomap may become very confusing to read when applied to a large and complex network.

Social Network Analysis

An understanding of individuals' normal, every day links to, and interactions with, others in their social networks is important. Some resources are exchanged reciprocally but sometimes the resource exchange is mainly one-sided. Network analysis maps the nature of these relationships in terms of properties and dynamics that are inherent in these relations (Turner, 1998). In the genetic counseling literature, there is scant information about how communication of genetic information and knowledge about family patterns differ in various ethnic, racial, and religious communities. The genetic counselor can use social network analyses to aid in this understanding because these social network interactions may influence how clients interpret information provided in genetic counseling sessions.

Concepts operationalized in the CEGRM have their origins in social network analysis and social exchange theory (Blau, 1986; Homans, 1974; Roloff, 1981; Turner, 1998). We are melding and using simplified versions of these two theoretical approaches. For example, we concentrate in the CEGRM on the exchange of three resources:

- symbols (mainly involving genetic information)
- material (mainly services, finances)
- emotions (feelings about inherited disease and risk)

Several other features of network analysis are especially pertinent to genetic counseling research. We hope to incorporate some of the following into our CEGRM interviews and notation:

- Directedness refers to the direction and sequence of the information flow.
- Reciprocity refers to the degree to which the social exchanges are reciprocated.

- Density of ties refers to the degree of connectedness among members of a social network. Many ties indicate a dense social network in which there are strong social connections; few ties indicate a weaker social network.
- Strength of ties refers to volume of resources flowing among members in the social network. A weak tie indicates few or sporadic amounts of resource flow and strong ties indicate the reverse.
- Bridge positions connect cliques (subgroups) or separated groups. Because members occupying bridge positions are involved in different subgroups, or groups, they are in a position to bring additional information learned through their participation in other groups back to their primary social network.

THE COLORED, ECOLOGICAL, GENETIC RELATIONAL MAP (CEGRM)

As stated above, the categories of (1) symbols, (2) material, and (3) emotions are those defined by the resource theorists (Turner, 1998). We recognize that these categories are not absolute nor mutually exclusive and that there is some overlap between social exchange categories, e.g., that information sharing (category 1) may have emotional overtones (category 3). In order to be more focused, the genetic counselor or researchers should carefully choose a few questions in each category that they believe to be particularly relevant for the client and the counseling process. If there were some meaningful overlap in categories, this may be a fruitful area to be explored further with the client.

There is always a tension between completeness of information provided and pictorial confusion if too much information is provided. A single CEGRM is not intended to be an all-encompassing map of significant other relationships and exchanges. One approach to simplify a given CEGRM is to use multiple CEGRMs. If further information is required in a certain family situation, then additional CEGRMs can be constructed and compared to the first one. For particularly complex and difficult families, several separate CEGRMs to investigate different aspects of one client's relationships with members in his/her social network or showing the social network from another family member's perspectives may be warranted (see Discussion).

Genetic counselors can construct CEGRMs based on oral or written information provided by clients, or clients can make their own. We believe that the CEGRM may be most useful to facilitate the client talking about important relationships, social exchanges, and communication patterns when clients themselves construct the CEGRM during a genetic counseling session. This affords an opportunity for people to talk about the relationships while they are placing the colored shapes on their social network map. By placing these colored shapes as surrogates for types of resource exchanges on the CEGRM, the client is taking ownership of the

Table I. Novel Elements of The CEGRM

- Incorporates social theory as well as psychological and family elements
- Emphasizes family as a social system of exchanges
- Includes affinal, fictive kin, friends, and others in the social network
- Clients/research participants have a more active role
- Facilitates process as well as product
- Provides a means to stimulate meaningful discussion with clients about their family and social network
- May detect temporal trends over time in a repeated series design
- Allows comparison of various family members' networks as well as of their unique impressions of how their family operates

relationships being described. It also may empower the client to have this more active role in the counseling session. Thus the process becomes as important as the product. If this is the way that the CEGRM is used, then it would be beneficial to tape record the session with the client's informed consent. Unfortunately, a research genetic counselor may face severe time constraints since often the clinic setting doubles as a research site. While having the client place the shapes in their appropriate places maximizes the richness of this approach, client information needed to draw a family pedigree is solicited in advance in some genetic counseling centers. Information about the nonfamily relationships could also be requested in advance so that the complete social network map would be ready at the time of the client's appointment.

A synopsis of some of the novel elements of the CEGRM is presented in Table I.

METHODS

Materials

While there are theoretically many ways to construct a CEGRM, we now give you our impressions of what might work best. The basic material that we are using consists of self-adhesive, color-coded labels. The materials needed for the CEGRM are inexpensive, easy to obtain, and easy to use. They can be bought at any large discount office supply store for under $5.00 per package. These come in seven different colors, but not all colors come in any one package. The labels come in various size circles, strips, and stars. They are easily removable so that if the client or genetic counselor makes a mistake and places a circle or star in the wrong place, she or he can simply lift the label off and place it on the appropriate social network member (see Table II). Copying paper size 8 1/2 × 11 or 11 × 17, depending on the size of the family, can be used to construct the CEGRM. Using the 11 × 17 paper size is ideal because it accommodates larger family and social network size and can be folded in half so that it would easily fit into the client's file. When the CEGRM is completed, it can be stored in a clear plastic folder or

Table II. CEGRM Color/Shape Convention[1]

Colors Represent Kinds of Resource Exchanges

- Blue — or black = symbols (information, ideas, values, messages)
- Green — or medium = material (services, material)
- Yellow — or light gray = emotions (feelings, approval, respect, love)

Circles Represent Types Of Exchange Interactions[2,3]

- Large Circle ◯ = reciprocation of resources of the same kind.
- Small Circle ◯ = non-reciprocal exchange, initiated by client

Stars ☆ Represent Key Social Network Players[2]

- Red star ✦ or ✦ = family member or non-family member who acts as a barrier or cutoff for dissemination of cancer genetics information.
- Green star ★ or ☆ = family member or non-family member who acts as a disseminator of cancer genetics information e.g., a genetic kin keeper.

Cancer symbols = C inside the figure

Footnotes:

[1]To be most effective, the CEGRM should be prepared in color, rather than black, gray and white, as in this printed version. The colored version can be downloaded at http://www.wkap.nl/journalhome.htm/1059-7700 or obtained from the first author.

[2]The circles and stars should be placed next to "other" in the interaction, not next to the client.

[3]If it is important to understand the resources that significant others in the social network offer to the client, but which the client does not reciprocate, then an additional symbol can be used.

copied using a color copier. While the labels stick quite well, it is wiser to copy the CEGRM immediately to avoid the possibility of a label falling off.

Methods: Construction of a CEGRM

It is probably best to start the CEGRM with the drawing of the family pedigree. Include as needed demographic information about the family/nonfamily members that the genetic counselor deems necessary, e.g., occupation, city they live in, etc. This is the time to add nonkin also. For this publication, we used a computer to design the presentation of the CEGRM in Figs. 1 and 2. As we indicated earlier in the paper, if the CEGRM is to be used widely, the entire construction process of the CEGRM needs to be computerized.

The counselor can use any questions he or she prefers in order to elicit information about the social exchanges of our designated categories of information, service, and emotions. Here we provide examples of types of questions that might be asked in each category. For illustration, we are using an example of a family with potential hereditary breast–ovarian cancer susceptibility (HBOC).

Information Category Sample Questions

- With whom do you share information about genetics and your health, and who shares genetic and health information with you?
- Whom might you ask to help you to obtain further genetic and health information about other family members and who might ask your help?

Service Category Sample Questions

- Who might you ask to come with you to a cancer genetics risk counseling session or important doctor's appointment and who might ask you to go with them?
- Who would you feel comfortable asking to baby sit with your children when you go for a genetic counseling appointment and who might ask you to do the same for them?

Emotions Category Sample Questions

- Who would you share your feelings with about cancer in the family and who would share their feelings with you?
- Whose feelings did you/would you consider when deciding to go for cancer genetic risk counseling or testing and who has considered yours?

Sample Question About Disseminators (For members of the social network who act as disseminators of genetic information in the family)

- Who tries to get you or other family members to talk about and obtain information about their genetic risk?

Sample Question About Barriers (For members of the social network who act as barriers to dissemination of genetic information in the family)

- Who tries to prevent genetic information from being discussed?

## HYPOTHETICAL CASE STUDIES

In order to demonstrate how CEGRMs might be constructed and interpreted, we present two examples of clients who come for cancer genetics risk counseling. These cases are purely hypothetical. The situations and dynamics are derived from composites of people we have known, interviewed, counseled, or read about in the literature. In these examples we will assume that the client constructs her own CEGRM, rather than having the genetic counselor construct it. Figure 1 depicts the CEGRM of resource exchanges for a client named Jane. Figure 2 depicts a CEGRM for the client's sister, Cynthia.

We will analyze the CEGRMs of Jane and Cynthia separately. Assuming informed consent is received from both sisters, we will compare these CEGRM patterns to show similarities and differences. We then would use this material in the counseling session to understand more fully the family dynamics and how these perceived family contexts might affect decision-making regarding genetic testing or management of a genetic predisposition or condition.

Example 1. Constructing Jane's CEGRM

Jane is the client who has come for breast cancer genetic risk counseling because her sister, aunt, and cousin have had breast cancer. She is 35 years old, recently married and interested in starting a family. She is a middle-level manager in the marketing division of a local corporation. The genetic counselor begins by informing Jane about the purpose of the CEGRM so that Jane will understand why she is being asked about her relationships within her social network. A combined family and nonfamily network is drawn. The genetic counselor then places a legend containing the colors and shapes and their explanations on the table in front of Jane to use as a reference guide and she reiterates orally what the colors and shapes indicate (see Table II). For example she tells Jane that reciprocity, as depicted in the CEGRM means that people exchange approximately the same thing, e.g., if Jane asks her friend Melanie if she has any sources of information about breast cancer, Melanie will ask Jane if she requires information about some medical problem she has.

To begin the process, Jane is asked, "With whom do you share information about genetics and health and who shares genetic and health information with
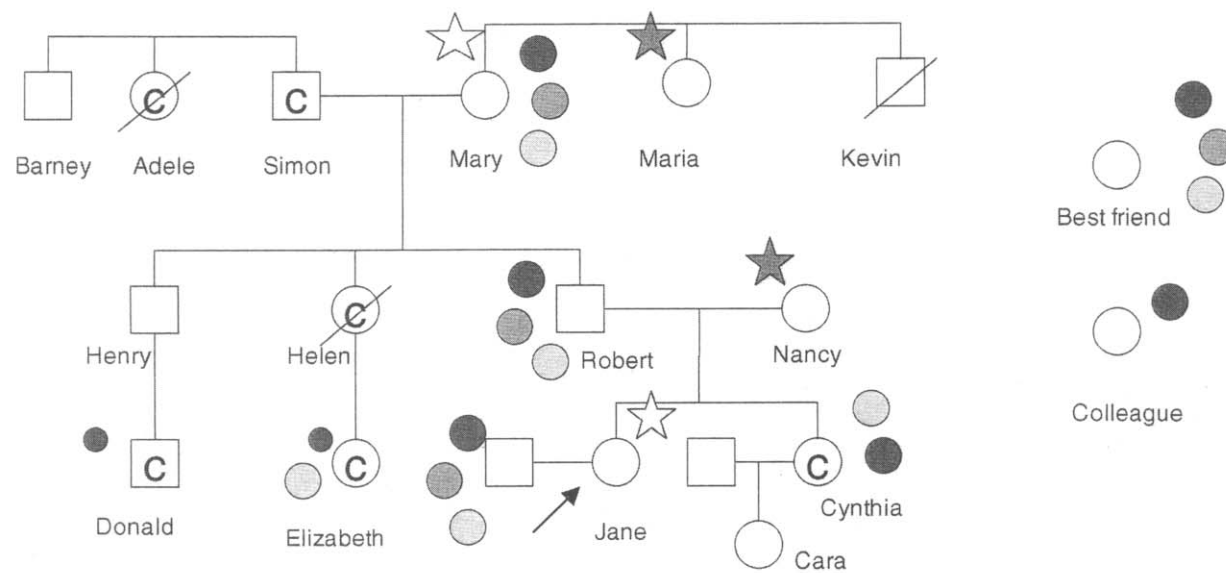
Legend: ● =information; ● =material,services; ● =emotion
Large circle ● = reciprocal exchange; Small circle ● = one way request
☆ = information disseminator; ★ = barrier, C = Cancer

Fig. 1. Jane's CEGRM in black and white. Color version online at http://www.wkap.nl/ journalhome.htm/1059-7700.

Legend: ● =information; ● =material,services; ○ =emotion
Large circle ● = reciprocal exchange; Small circle ● = one way request
☆ = information disseminator; ★ = barrier, C = Cancer

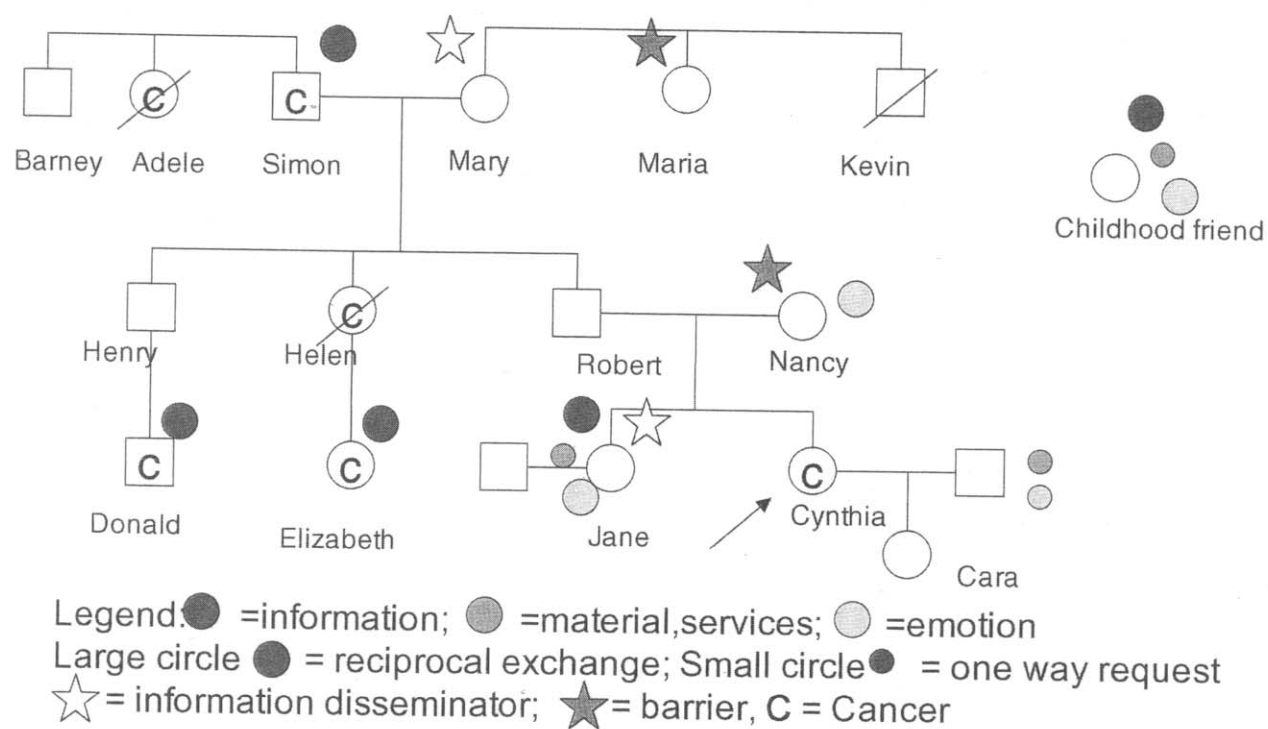**Fig. 2.** Cynthia's CEGRM in black and white. Color version online at http://www.wkap.nl/ journalhome.htm /1059-7700.

you?" Jane is given a strip with large blue circles and told to place one of them next to each family and nonfamily member to whom this applies. She is told that the large blue circle indicates a reciprocal offering of information between Jane and others. When Jane is finished placing the large blue circles, she is given small blue circles and asked to place them next to those family and nonfamily members with whom she initiates the interaction, but it is only one-way.

This process is repeated for green circles. Jane is asked the reciprocal and unidirectional versions of the question, "Who might you ask to come with you to a cancer genetics risk counseling session (and who might ask you to accompany them to such a medical appointment)?" This process is repeated once again for yellow circles, with the reciprocal and unidirectional versions of the question, "With whom would you share your feelings about cancer in the family (and who would share their feelings about cancer or some illness in their family with you)?" These questions are phrased in this broad way to be able to include reciprocal relationships with nonbiological members of the social network.

When this phase is completed, Jane is asked to place a green star next to any family member or nonfamily member who acts as disseminator, facilitator, or provider of cancer information in the family. Lastly, Jane is asked to place a red star next to any family member or friend who acts as a barrier or cutoff for the dissemination of cancer information in the family. This is the conclusion of constructing Jane's CEGRM (see Fig. 1).

Example 1. Interpretation of Jane's CEGRM

We can see from Jane's CEGRM in Fig. 1 that Jane sees herself in a central position as a disseminator of genetic breast cancer related information in the family as she conveys such information to *six* family members. She also operates a bridge position as she uses a friend and colleague as additional outside sources of information. Jane's informational, service, and emotional exchanges are largely reciprocal. She exchanges all three categories with three members of the family—her husband, father, and paternal grandmother Mary—and her best friend. She also exchanges both information and expressions of her feelings with her sister Cynthia and exchanges expressions of feelings with her cousin Elizabeth, both of whom had breast cancer. Jane, however, does not engage in any one-way or reciprocal exchanges with her mother in any of the areas asked about in the CEGRM.

Jane's paternal grandmother, Mary, is also seen as a disseminator and she and her grandmother seem to be working in tandem, while Jane's mother Nancy is acting as a barrier as is her grandmother's sister Maria. It is interesting to note that both women who act as barriers do not come from families that are likely to carry a familial cancer susceptibility gene mutation. The familial pattern seems to run on Jane's paternal grandfather's side. Jane's grandmother also does not come from a familial cancer family, but she acts as a disseminator. She may be motivated

to disseminate information because so many of her loved ones have developed cancer, namely, her husband, one daughter, and three grandchildren.

While Jane's ties are strong and dense with her husband, sister, father, and paternal grandmother, she does not exchange any of the three resources with her paternal grandfather possibly because he has had prostate cancer and has coronary heart disease. We can speculate that his wife (Jane's grandmother) who is a disseminator of cancer genetics information in the family takes care of these needs. As Jane reciprocates in all areas with her grandmother, we might infer that she indirectly exchanges information and feelings with her grandfather as well. Because Jane's mother is perceived as a barrier to dissemination and Jane does not interact with her on these matters, we can speculate that Jane's father is more likely to be selective in passing along information about cancer genetics or Jane's feelings about the familial pattern to Jane's mother.

The relationships between members of the family who act as disseminators of cancer information and those who act as barriers need to be investigated further as does the relationship between Jane and her mother. Jane may engage in other kinds of reciprocal or one-way exchanges with her mother, but we do not know that from the CEGRM. It is likely that their opposing roles in the family, regarding dissemination of the genetic cancer information, places some stresses and limitations on their relationship. Another avenue of investigation that should be pursued is the lack of contact with her uncle Henry and his immediate family. Jane's only contact with them is through her unidirectional delivery of genetic cancer information to her cousin Donald in her role of disseminator. We cannot tell whether there is much interaction with this branch of the family at all. But this question should be pursued as this branch may have valuable information.

Example 2. Constructing Cynthia's CEGRM

Jane has a sister Cynthia age 37 who is married, has one daughter and is a stay-at-home Mom. She had breast cancer diagnosed when she was 35 year old. It was detected early. She had a lumpectomy and radiation, and so far she is in remission. After Jane had cancer genetic risk counseling, and spent several months trying to persuade her, Cynthia decided that she would also seek genetic cancer risk counseling. The genetic counselor will present the same information about constructing the genogram to Cynthia as she did to Jane. We don't know without inquiring whether Jane may have previously told Cynthia something about her experience. Cynthia would then construct her CEGRM based on the same questions that Jane was asked. It would be analyzed separately and compared with Jane's CEGRM, after receiving informed consent from both sisters. While they are members of the same family, their social networks might be quite different.

information regarding patterns of illness and attitudes toward illness and ill people in the family. Moreover, as genetic tests for more genetic diseases are developed, it becomes crucial to learn about the complexities of balancing autonomy and responsibility within the family in order to offer genetic testing in an ethically responsible way. Ethical standards cannot be absolute as there are different obligations for different relationships within the family and these relationships need to become known and understood. Genetic counselors deal with ethical dilemmas similar to those arising from overlapping relationships and conflicting roles among care givers, patients, and families found in small towns and rural communities (Roberts *et al.*, 1999).

Ethical concerns need to be given top priority when conducting reciprocal relationship research, whether it is in relation to the construction of a genogram, ecomap or CEGRM, particularly those dealing with confidentiality and invasion of privacy. The genetic counselor may become privy to information that members of the client's social network never expected to be brought to someone else's attention, let alone written in a medical record. This becomes particularly crucial when more than one member of the family is being seen. Geneticists are keen to disseminate important genetic information in families where members may be at-risk for inheriting a genetic disease without knowing whether these members want the information. Thus, without specific informed consent from any of the partners in the client's relational nexus, individuals may be unintentionally harmed. Another ethical concern is whether diagramming social resource exchanges in vulnerable families may unleash emotions which neither the client nor counselor can handle. This outcome is unlikely, but the counselor needs to be alerted to this possibility and have back-up professional help available.

Why the need for the CEGRM when the genogram already identifies structural and functional patterns, quality of relationships, and significant life events (Beauchesne *et al.*, 1997) and has been expanded into a wide number of fields? We believe that the CEGRM is more encompassing. The genogram arises from the field of therapeutic social work and marriage and family therapy. McGoldrick and Gerson's standardization emphasizes dysfunctions in the family. The CEGRM, however, emphasizes normal social functioning in various domains of interest. A client's social network, composed of both family and nonfamily members, involves ties and sharing of resources. It is the basic social context in which the client operates and which impinges on most of her life decisions. Many of these ties and resource exchanges can lead to the development of false assumptions about genetic risk in the family—what Richards (1996) refers to as "lay genetic knowledge" which operates independently of genetic inheritance patterns. Furthermore, these ties and resource exchanges do not necessarily fit into a conflictual, broken, or fused category.

Social network analysis and resource theory have been underdeveloped in the area of genetic counseling research. Information, which is a valuable resource,

and intrinsic to the genetic counseling process, requires further conceptualization (Foa *et al.*, 1993). The communication of inheritance-based information regarding late-onset diseases can be a cause of conflict and disruption in a family. Possibly, this is because information not only has an intrinsic value, but is also valued because it provides or prevents access to other classes of resources such as status, or love.

A strong family orientation is frequently part of existing genetic counseling practice. Because of time and payment constraints, however, this aspect sometimes gets truncated. Thus it makes sense to conduct research into the most feasible ways to include the family element. The use of the CEGRM is one approach. We see it as a tool for the genetic counseling research community to experiment with, clarify, refine, and amend. The CEGRM should be a helpful tool for genetic counseling researchers who accept the perspective that social reality is co-constructed from the ideas of both the client and health provider and support a collaborative approach to health education and counseling (Kenen and Smith, 1995; Kuehl, 1995).

ACKNOWLEDGMENTS

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